Listing of Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1. (currently amended) A current control device comprising:

(a) two electrodes electrically conductive and non-movable;

(b) an ~~electrically nonconductive~~ isolator electrically nonconductive and non-movable;

(c) at least one pressure plate electrically nonconductive and movable;

(d) at least one dynamically controllable actuator comprising an active element lengthwise disposed and capable of lengthwise dimensional variations when activated by an electrical charge separate and distinct from a current passing through said electrodes, said dynamically controllable actuator fixed at one end and attached at a second end to said pressure plate; and

(e) a pressure conduction composite, said pressure conduction composite and said isolator disposed between said electrodes, said pressure conduction composite contacting without separation said electrodes, said isolator, and said at least one pressure plate, said pressure conduction composite either resistive or conductive based on presence or absence of compression imposed by said at least one pressure plate.

Claim 2. The current control device of claim 1, wherein said pressure conduction composite is porous.

Claims 3-6. (withdrawn)

Claim 7. (currently amended) The current control device of claim 1, wherein said dynamically controllable actuator is comprised of a shape memory alloy.

Claims 8-9. (withdrawn)

Arguments Against Rejection

CLAIM REJECTION – 35 U.S.C. § 102(b)

In order to establish anticipation, it is incumbent upon the examiner to identify in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 U.S.P.Q. 481 (Fed. Cir. 1984)*. When the claimed invention is not identically disclosed in a reference, and instead requires picking and choosing among a number of different options disclosed by the reference, then the reference does not anticipate. *Akzo N.V. v. U.S. Int'l Trade Comm'n, 808 F.2d 1471, 1480, 1 U.S.P.Q.2d 1241, 1245-46 (Fed. Cir. 1986), cert. denied, 482 U.S. 909, 107 S.Ct. 2490 (1987); In re Arkley, 59 C.C.P.A. 804, 455 F.2d 586, 587-88, 172 U.S.P.Q. 524, 526 (1972).*

Claims 1 and 2 are rejected as being anticipated by DuRocher, U.S. Patent No. Re. 28,595.

The rejection is traversed.

DuRocher fails to disclose each and every element of the claimed invention, arranged as in claims 1 and 2, and therefore fails to anticipate the invention.

DuRocher does not teach the dynamic controllability of the present invention. Rather, DuRocher describes a control apparatus wherein mechanical screws 49 (FIG. 9) and 53 (FIG. 11) are employed to statically assemble printed circuit members and backing members about a composite body. While during assembly screws may be used to statically compress the composite body so that it is conductive, there is absolutely nothing described or claimed that would suggest adjustment to the screws in a dynamically controllable fashion so as to alter the compression state

of the composite body.

Rather, FIG. 9 in DuRocher shows several rigid conductors 48 statically disposed within a nonconductive carrier 47 and compressing a composite body 12 so that the composite body provides an electric pathway between two conductors 48 and 46. *(see col. 7, lines 60-67)* Screws 49 are not and cannot function as actuators, since this would compromise the integrity of the control device so as to allow moisture to contaminate the printed circuit.

Rather, FIG. 11 in DuRocher shows a pair of conductors 51 statically disposed about and compressing a composite body 12 so that the composite body provides an electric pathway between the conductors 51. *(see col. 8, lines 11-17)* Screws 53 are not and cannot function as actuators, since this would compromise the integrity of the control device so as to allow moisture to contaminate the printed circuit.

Rather, FIG. 4 in DuRocher shows a device wherein several conductive portions electrically isolated from each other are statically and separately compressed between paired arrangements of electrically conductive terminals 33 and 35 via a spring 43 so that conductive portions are conductive.

Current flow through the conductive portions in FIGS. 4, 9, and 11 is terminated via heat related expansion of the non-conductive matrix within the composite (referred to as portions 6) which separates conductive particles thereby breaking the electric pathway within the composite. *(see col. 9, lines 24-38, lines 52-63)* The construction described in FIGS. 4, 9, and 11 permit sufficient expansion of the composites so as to terminate conduction through the composites. There is absolutely nothing in FIGS. 4, 9, and 11 that suggests dynamically controlled actuators wherein compression and decompression rather than heating is used to control resistance and

compression within a composite.

In the present invention, a dynamically controllable actuator is provided to move a non-conductive pressure plate against a pressure conduction composite so as to compress and decompress the composite thereby altering its resistive properties. The dynamically controllable actuator is a beam-like device composed of an active element, activated by an electrical current, capable of lengthwise dimensional variations so as to compress and decompress a pressure conductive composite. The dynamically controllable actuator is electrically isolated from electrodes and the pressure conduction composite via the non-conductive pressure plate. It is the non-conductive pressure plate which dynamically compresses the composite. In contrast, DuRocher relies on electrically conductive conductors 46 and 48 (FIG. 9) and 51 (FIG. 11) to statically compress the composite body. In the present invention, compression and decompression of the pressure conduction composite is responsible for switching between conduction and non-conduction. In contrast, DuRocher relies on heating within and thermal expansion of the composite body for switching.

For these reasons, it is respectfully submitted that the Section 102(b) rejection is misplaced, and reconsideration and withdrawal of the same are respectfully requested.

Claims 1 is rejected as being anticipated by Dubilier, U.S. Patent No. 1,728,045.

The rejection is traversed.

Dubilier fails to disclose each and every element of the claimed invention, arranged as in claim 1 and therefore fails to anticipate the invention.

Dubilier does not teach the dynamic controllability of the present invention. Rather, Dubilier describes a controlling device wherein a mechanical screw 65 is attached to a wire 62, as

shown in FIG. 18. When the wire 62 is heated by current flowing through carbon blocks about the wire, it pulls a plate which compresses the carbon blocks thereby increasing their electrical resistance and terminating current flow. Unlike the present invention which provides a dynamically controllable actuator composed of an active material lengthwise disposed and capable of lengthwise dimensional variations when activated by an electrical charge from a source separate and distinct from the current passing through the current control device, Dubilier relies on heating of a wire by current passing through the controlling device. More specifically, an electrical charge is passed through the actuator to activate and to control actuator function in the present invention. Whereas, Dubilier specifically teaches against an electrical current flowing through the wire for its control. *(see 4th page of text, left column, line 45-46)*

For these reasons, it is respectfully submitted that the Section 102(b) rejection is misplaced, and reconsideration and withdrawal of the same are respectfully requested.

Claims 7 is rejected under 35 U.S.C. 103 (a) as being unpatentable over DuRocher in view of Poirier et al.

The rejection is traversed.

The following non-inclusive technical differences are noted between the present invention and DuRocher.

The present invention compresses and decompresses a pressure conduction composite via the controllable movement of at least one non-conductive pressure plate. DuRocher compresses a composite body between two electrically conductive terminals 33 and 35 so as to enable an electrical pathway through the composite. DuRocher requires heating and expansion of the composite to terminate current flow. There is absolutely nothing in DuRocher and Poirier

suggesting the use of a spring composed of shape memory alloy to selectively compress and decompress the composite body so as to alter resistivity. For that reason, the references are not available for citation against claim 7.

The combination of Poirier and DuRocher is not possible. DuRocher compresses a composite body between a terminal 33 contacting a first connector member 28 and a terminal 35 contacting a second connector member 34. Connector members 28 and 34 are biased towards one another via a spring 43. *(see col. 7, lines 14-19)* The spring 43 also compresses a pair of flanges 8 and 9 between the connector members 28 and 34 so as to effect a seal which completely surrounds the terminals 33 and 35 and conductive portions 6 residing within the body 5. This seal shields the terminals 33 and 35 and conductive portions 6 against contamination by moisture and other foreign matter which would degrade performance. *(see col. 7, lines 41-47)* The application of shape memory alloy from Poirier within the spring taught by DuRocher would allow relative movement between connector bodies 28 and 34 so as to break the seal formed with flanges 8 and 9 thereby exposing conductive portions 6 to contamination. For that reason, the combination could not be obvious to one skilled in the art.

The combination of Poirier and DuRocher is not possible.

The present invention compresses a pressure conduction composite via a non-conductive movable pressure plate. Any separation between pressure conduction composite and non-conductive movable pressure plate in the present invention will not cause arcing between the two components due to the non-conductivity of the pressure plate. Arcing is undesired as it damages and degrades the pressure conduction composite and pressure plate.

DuRocher compresses conductive portions 6 between two conductive terminals 33 and

35. Shape memory alloys (SMAs) provide two selectable states, namely rigid and non-rigid. The application of shape memory alloy from Poirier within the spring taught by DuRocher would allow larger relative movement between terminals 33 and 35 and conductive portions 6 when the SMA is non-rigid so as to cause gapping which would result in arcing and damage to terminals and conductive portions. Arcing and arc related damage is specifically avoided by DuRocher where he relies on expansion of the conductive portions 6 to change resistivity. DuRocher relies on thermal expansion of the conductive portions 6 so as to maintain contact between terminals 33 and 35 and conductive portions 6 so as to avoid gapping and resultant arcing and arc related damage. For that reason, the combination could not be obvious to one skilled in the art.

For the reasons stated herein, it is respectfully submitted that the Section 103 rejection is misplaced, and reconsideration and withdrawal of the same are respectfully requested.